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KNOX COUNTY REGIONAL FORENSIC CENTER

2761 SULLINS STREET, KNOXVILLE, TN 37919

FAX: 865-215-8001

EMAIL: INV.KNOXRFC@KNOXCOUNTY.ORG

Demographic Information

Case number: 190728-31	Address 1: 6118 Cateland Lane
Death County: Knox	Address 2:
Last name: Binkley	City: Powell
First name: Jonathan	State: Tennessee
Middle name: Reed	County: Knox
Race: White	Zip: 37849
Sex: Male	
Age: 35 years 8 months 25 days	
Date of birth: 11/01/1983	

Background Information

Investigator notified: 2019-07-27 23:05	Date LKA: 07/27/2019
Notified by: Knox County Sheriff's Office	Time LKA: 21:40
Facility: Dispatch	Found dead: 07/27/2019 23:05
Authorized by: Knox County, TN	911 call received: 2019-07-27 21:40
ETA at Facility/FH: Megan Sharpe	Date of death: 07/27/2019 On
Scene investigated ME: Yes	Time of death: 23:44
Scene investigated by LE: Yes	Pronounced: 07/27/2019 23:44
Officer: Cook, Whillock (KPD); Sanders, Clabough (KCSO)	Scene arrival: 2019-07-27 23:44
Agency: Knoxville Police Department	Scene departure: 2019-07-28 00:41
Incident #: 19-030951	

First Responder

Name:	Phone:
Agency:	Relationship:

Next of Kin

Name: Ledford, Anne	Relationship: Mother
Address:	Notified:
City:	Notifying agency:
State:	Date/Time notified:
Zip:	Notified by:
Phone:	

Cause and Manner of Death

Reason for reporting: Custody Death
Disposition: Sent to Autopsy Facility
Suspected COD: Unknown/Other

I hereby declare that after receiving notice of death described herein, I conducted an investigation regarding the cause of death in accordance with Section 38-7-109 Tennessee Code Annotated and that the information contained herein regarding such death is true and correct to the best of my knowledge and belief.

Authorization: ME/C ordered
RFC MDI: Megan Sharpe

DC signed by: Office of ME/C
DC signer: Chris Lochmuller

In accordance with Tennessee Code Annotated 38-7-106, the accompanying body of Binkley, Jonathan is the subject of an investigation by the medical examiner.

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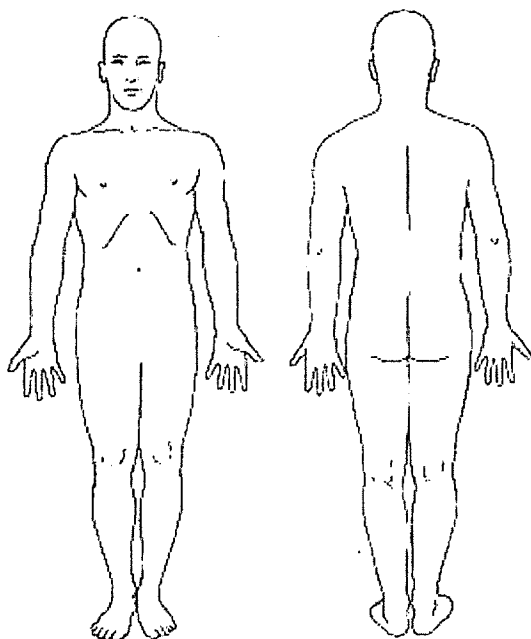
Rigor: Early
Lividity A: Consistent with body position
Lividity B: Blanching easily
Position discovered: Supine
Approx. height: 71 in
Approx. weight: 279 lbs
Injury to bowel: No

Body location: Outdoors
Body temperature: Cool
Outside temperature: 72
Thermostat setting: Unknown
Thermostat reading: Unknown
Room temperature: Unknown
Non-therapeutic needle marks: Unknown

Suspected Medical Conditions

Drug Abuse

External Injuries and Descriptions



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REGIONAL FORENSIC CENTER

KNOX COUNTY

2761 Sullins Street, Knoxville, TN 37919 • Phone: 865-215-8000 • Fax: 865-215-8001

Final Autopsy Report

Patient: **BINKLEY, JONATHAN R**
DOB/Gender: 11/01/1983 (Age 35) M
Authorized by: Christopher Lochmuller, MD
Relationship to Patient: Knox County Chief Deputy Medical Examiner
Restrictions: None
Persons Attending Autopsy: Inv. Allen Cook (KPD)

Accession #: **190728-31**
Client: Knox County
Date of Death: 07/27/2019 23:44
Date of Autopsy: 07/28/2019 09:00
Reported: 12/11/2019

Narrative

This 35-year-old man, Jonathan R. Binkley, died of combined fentanyl and methamphetamine intoxication. Other conditions that significantly contributed to death are hypertensive cardiovascular disease and obesity. The manner of death is accident.

By report, on July 27, 2019 at 21:40 hours, the Knox County Sheriff's Office began a vehicular pursuit of a reportedly stolen vehicle. During the pursuit the vehicle left the roadway and got stuck. Law enforcement removed the male driver (Mr. Jonathan R. Binkley) from the vehicle and eventually placed him on the ground. He subsequently went unresponsive. Despite medical intervention for 30 minutes he remained asystolic. Mr. Binkley was officially pronounced dead at the scene at 23:44 hours. His past medical history is significant for hypertension, intravenous heroin abuse, and a heroin overdose on October 7, 2018.

An autopsy revealed an enlarged (thickened and dilated) heart related to a combination of long-standing high blood pressure and obesity. No significant injuries were seen. Postmortem femoral blood and urine were sent for toxicologic analysis. See separate toxicology report by NMS Labs.

Enlarged hearts are pathologic, prone to electrical instability and sudden cardiac arrest, and less tolerant of the combined toxicity of fentanyl and methamphetamine.

A handwritten signature in cursive script, reading "Christopher Lochmuller".

Christopher Lochmuller, MD
Board Certified Forensic Pathologist
Chief Deputy Medical Examiner for Knox and Anderson Counties

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Final Anatomic Diagnosis

- I. Combined fentanyl and methamphetamine intoxication
 - A. See separate toxicology report by NMS labs
 - B. Presence of morphine and 6-MAM in the urine indicative of recent heroin use
- II. Hypertensive cardiovascular disease
 - A. Dilated cardiomyopathy
 - 1. Cardiomegaly, 570 grams
 - 2. Concentric left ventricular hypertrophy
 - 3. Four chamber dilatation, mild
 - B. Benign nephrosclerosis, mild
 - C. Hypertensive cerebrovascular disease
- III. Obesity
 - A. Body mass index of 38.9 kg/m²
 - B. Dilated cardiomyopathy
- IV. No significant injuries were seen

Other findings:

- I. Chronic pancreatitis, mild to moderate
- II. History of intravenous heroin abuse
 - A. Multiple upper extremity needle tracks
 - B. Injected foreign material within the lungs, liver, and spleen
 - C. Chronic hepatitis, low-grade and low stage

Gross Description**EXTERNAL EXAMINATION**

The body is that of a well-developed, obese (with a body mass index of 38.9 kg/m²), adult, white male who weighs 279 pounds, is 71 inches in length, and appears compatible with the stated age of 35 years. There is a morgue identification band secured around the right leg and an additional morgue identification band secured around the right leg with the Knox County Regional Forensic Center body bag seal number 0591447.

The body is received clad in a T-shirt, tank top, a pair of underwear, and a pair of socks. Additional personal items that accompanied the body are listed on the property/evidence log. A Knox County Regional Forensic Center body bag seal accompanied the body with the number 0591447.

The body is warm. Rigor mortis is partially fixed. Blanchable, red-purple livor mortis extends over the posterior surfaces of the body, except in areas exposed to pressure. Brown dirt is seen on some of the exposed skin and clothing. The scalp hair is brown, curly, and short. The face, neck, and upper chest are severely congested, red-purple. Dried stomach contents and blood are seen on the face. The corneas are translucent. The irises are brown. The pupils are round. The conjunctivae are moderately congested and the sclerae are white. There are rare, red petechial hemorrhages within the conjunctivae. The nose, ears, and lips are normally developed. The face has a brown, short beard. The teeth are natural and in adequate condition. The neck is atraumatic. The thorax is well developed and symmetrical. The abdomen is obese with multiple, tan striae that measure 1 inch to 12 inches long. The spine is normally formed and the surface of the back is free of lesions. The anus is free of lesions. The external genitalia are those of a normal, adult male without trauma. The upper and lower extremities are well developed and symmetrical, without the absence of any digits.

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IDENTIFYING MARKS, SCARS, AND TATTOOS: The anterior aspect of the right forearm has several, gray, firm needle tracks that measure 3/16 inch to 2 inch long. The anterior aspect of the left forearm has several, gray, firm needle tracks that measure 3/16 inch to 2-3/4 inch long. The lateral aspect of the left shoulder and arm have a tattoo. The right arm and the lateral aspect of the right shoulder have a tattoo mural. The anterior aspect of the distal right thigh has two tattoos.

EVIDENCE OF THERAPEUTIC INTERVENTION: In the mouth is in airway secured with a strap. The middle of the chest has a 4 x 5 inch, tan to purple, furrowed, discontinuous LUCAS device mark and a 5 x 1-1/2 inch, dark yellow abrasion related to external chest compressions. Two defibrillator pads are secured to the torso. In the anterior aspect of the proximal left leg is an intraosseous catheter. The left second through fifth ribs each have an anterior fracture, the left third through eighth ribs each have parasternal fracture, and the right third through fifth ribs each have an anterior fracture related to external chest compressions.

EVIDENCE OF INJURY:

DESCRIPTION OF BLUNT FORCE INJURIES:

Head: The right side of the forehead has a 1-1/4 inch long laceration. The left side of forehead has a 2 x 1-1/4 inch, abraded, focally lacerated, purple-red contusion. The face has several, 1/16 inch to 1 inch, red abrasions. The left side of the upper and lower lips have a 1/2 x 1/4 inch, lacerated, purple contusion. The top of the right ear has 1 x 3/16 inch, dark yellow abrasion.

Torso: The torso has multiple, 1/16 inch to 2 inch, yellow to red abrasions and multiple red to purple contusions that measure 3/8 inch to 6 inches in greatest dimension. The left ninth and tenth ribs each have a lateral fracture and the left eighth through eleventh ribs each have a posterior fracture.

Extremities: The extremities have multiple, scattered, 1/16 inch to 3 inch, yellow to red abrasions and multiple, scattered, 1/4 inch to 4-3/4 inch, brown to purple to red contusions. The back of the left hand and the lateral aspect of the left wrist have a 4 x 1 inch, discontinuous, tan to purple, contused handcuff mark. The back of the right hand and anterior and lateral aspects of the right wrist have a 9 x 3/8 inch, discontinuous, minimally furrowed, tan to purple, contused handcuff mark.

Posterior cutdowns of the neck, torso, and extremities reveal several, scattered, minor to small areas of purple soft tissue hemorrhage.

INTERNAL EXAMINATION

BODY CAVITIES: There are no adhesions or abnormal collections of fluid in any of the body cavities. All of the body organs are in a normal (anatomic) position. The serous surfaces are smooth and glistening.

CENTRAL NERVOUS SYSTEM: The brain weighs 1500 grams. The dura mater and falx cerebri are intact and not adherent to the brain. The leptomeninges are thin and transparent. There is no epidural, subdural, or subarachnoid hemorrhage. The cerebral hemispheres are symmetrical and congested. The structures at the base of the brain, including cranial nerves and blood vessels, are free of abnormality. Sections through the cerebral hemispheres reveal no lesions within the cortex, subcortical white matter, or deep parenchyma of either hemisphere. The cerebral ventricles are of normal caliber. Sections through the brainstem and cerebellum reveal no lesions.

NECK: Examination of the soft tissues of the neck, including an anterior layered neck dissection, reveals no abnormalities of the strap muscles and large vessels. A posterior neck dissection is negative for any

paraspinous soft tissue hemorrhage or ligamentous injury. The hyoid bone and larynx are intact. The tongue is normal.

CARDIOVASCULAR SYSTEM: The heart weighs 570 grams. The pericardial sac is free of significant fluid or adhesions. The pericardial surfaces are smooth and glistening. The coronary arteries arise normally and follow the distribution of a right dominant pattern without significant atherosclerosis.

The atria and ventricles are mildly dilated. The valves are normally formed, thin, pliable, and free of vegetations and degenerative changes. The following circumferential valve measurements are obtained: 13 cm for the tricuspid valve, 8 cm for the pulmonic valve, 11 cm for the mitral valve, and 7 cm for the aortic valve.

The myocardium is dark red-brown, firm, and free of focal or regional fibrosis, erythema, hemorrhage, pallor, or softening. The atrial and ventricular septa are intact and the septa and free walls are free of muscular bulges. The left ventricle measures 1.6 cm, the ventricular septum measures 1.6 cm, and the right ventricle measures 0.3 cm in thickness as measured 2 cm below the respective atrioventricular valve annulus.

The aorta and its major branches arise normally and follow the usual course with diffuse, moderate aortic atherosclerosis. The ostia of the major aortic vascular branches are patent. The venae cavae and its major tributaries are patent and return to the heart in the usual distribution and are unremarkable.

RESPIRATORY SYSTEM: The right and left lungs weigh 780 grams and 750 grams, respectively. The upper and lower airways are unobstructed and the mucosal surfaces are smooth and yellow-tan. The pleural surfaces are smooth and glistening. The pulmonary parenchyma is red-purple and the cut surfaces exude a severe amount of frothy fluid. The pulmonary arteries are normally developed and without thromboemboli and atherosclerosis. There is no saddle embolus on the in situ examination of the pulmonary trunk.

HEPATOBIILIARY SYSTEM: The liver weighs 3680 grams. The hepatic capsule is smooth, glistening, and intact, covering brown parenchyma. The cut surfaces are unremarkable. The gallbladder contains 9 mL of bile and no stones. The gallbladder mucosa has a yellow, reticular appearance (cholesterolosis). The extrahepatic biliary tree is patent.

ALIMENTARY TRACT: The esophagus is lined by grey-white, smooth mucosa. The serosa of the stomach is smooth and glistening. The gastric lumen contains 200 mL of brown fluid mixed with partially digested food fragments. The gastric mucosa is tan, glistening, and partially autolyzed. The serosa of the small bowel and colon is smooth and glistening. The small bowel contains enteric fluid and partially digested food fragments and the colon contains formed stool. The mucosa of the small bowel and colon is tan and glistening with no lesions. The appendix is present. The pancreas has a normal, tan and lobulated appearance.

RETICULOENDOTHELIAL SYSTEM: The spleen weighs 650 grams and has a smooth, intact capsule covering red-purple, moderately firm, congested parenchyma. The splenic white pulp is visible. The rib bone marrow is red-purple.

GENITOURINARY TRACT: The right and left kidneys weigh 190 grams and 210 grams, respectively. The renal capsules are smooth, thin, semitransparent, and strip with ease from the underlying smooth, red-brown, firm, cortical surfaces. The cortices are of normal thickness and delineated from the medullary pyramids. The calyces, pelves, and ureters are non-dilated and free of stones. The urinary bladder contains 80 mL of urine. The bladder mucosa is grey-tan and smooth. The prostate is not enlarged. The bilaterally descended testes are of normal size and consistency. The cut surfaces of the testes are unremarkable.

ENDOCRINE SYSTEM: The pituitary gland is not enlarged. The thyroid gland is of normal position, size, color, and texture. The adrenal glands have a normal shape with a grey medulla and a yellow cortex.



MUSCULOSKELETAL SYSTEM: Other noted above, the bony framework, supporting musculature, and soft tissues are not unusual. The cervical spinal column is stable on internal palpation.

ADDITIONAL STUDIES: Dipstick analysis of the vitreous fluid was negative for elevated glucose and for the presence of ketones. Full-body (FOBOS) radiographs were obtained.

Microscopic Description

Sections of the heart reveal myocyte hypertrophy and perivascular and perimysial fibrosis. Sections of the lungs reveal atelectasis, vascular congestion, edema, scattered droplets of intravascular fat related to external chest compressions, minimal distal airspace blood, hyalinized and irregularly thickened bronchial basement membranes, bronchial smooth muscle hyperplasia, and occasional polarizable, birefringent, distal airspace/perivascular/alveolar septal foreign material that is generally associated with a macrophage/giant cell response. In addition, scattered particles of aspirated starch are seen. The spleen has reactive white pulp with frequent general centers, congested red pulp, hyalinized vessels, and infrequent minute particles of polarizable, birefringent foreign material generally associated with a perivascular/pigmented macrophage. The pancreas has mild fatty replacement and mild to moderate acinar cell loss associated with hyalinized replacement fibrosis and isolation/aggregation of islets of Langerhans. The liver has patchy macrovesicular steatosis, scattered intralobular foci of chronic (predominantly lymphocytic) inflammation associated with hepatocyte loss, up to severe chronic (predominantly lymphocytic) portal inflammation, multifocal interface hepatitis, and infrequent minute particles of polarizable, birefringent foreign material within predominantly pigmented portal macrophages. The kidney is partially autolyzed and has vascular congestion, diffuse/global mesangial thickening, mild hyaline arteriolosclerosis, and a focal globally sclerosed glomerulus. Sections of the brain reveal thickened and hyalinized intraparenchymal arteries associated with perivascular rarefaction and hemosiderin-laden macrophages.

SLIDE KEY:

- A1: left ventricle x3
- A2: ventricular septum x3
- A3: right ventricle x3
- A4: left lung (peripheral section of each lobe and central bronchus)
- A5: right lung (peripheral section of each lobe and central bronchus)
- A6: liver, pancreas, spleen
- A7: kidney
- A8: frontoparietal watershed
- A9: left hippocampus
- A10: right hippocampus
- A11: cerebellum



NMS Labs

200 Welsh Road, Horsham, PA 19044-2208

Phone: (215) 657-4900 Fax: (215) 657-2972

e-mail: nms@nmslabs.com

Robert A. Middleberg, PhD, F-ABFT, DABCC-TC, Laboratory Director

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Toxicology Report

Report Issued 08/15/2019 14:05

To: 10511

Knox County Medical Examiner's Office

Attn: Ellie Sanders

2761 Sullins Street

Knoxville, TN 37919

Patient Name Binkley Jonathan R

Patient ID 190728-31

Chain 190728-31

Age 35 Y DOB 11/01/1983

Gender Male

Workorder 19227051

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Positive Findings:

<u>Compound</u>	<u>Result</u>	<u>Units</u>	<u>Matrix Source</u>
4-ANPP	Positive	ng/mL	001 - Femoral Blood
Caffeine	Positive	mcg/mL	001 - Femoral Blood
Cotinine	Positive	ng/mL	001 - Femoral Blood
Naloxone	Positive	ng/mL	001 - Femoral Blood
Quinine	Positive	ng/mL	001 - Femoral Blood
Diphenhydramine	300	ng/mL	001 - Femoral Blood
Amphetamine	13	ng/mL	001 - Femoral Blood
Methamphetamine	290	ng/mL	001 - Femoral Blood
Fentanyl	32	ng/mL	001 - Femoral Blood
Norfentanyl	7.0	ng/mL	001 - Femoral Blood
Morphine - Free	670	ng/mL	003 - Urine
6-MAM - Free	160	ng/mL	003 - Urine

See Detailed Findings section for additional information

Testing Requested:

<u>Analysis Code</u>	<u>Description</u>
8052B	Postmortem, Expanded, Blood (Forensic)
8665U	6-Monoacetylmorphine - Free (Unconjugated), Urine

Specimens Received:

<u>ID</u>	<u>Tube/Container</u>	<u>Volume/ Mass</u>	<u>Collection Date/Time</u>	<u>Matrix Source</u>	<u>Miscellaneous Information</u>
001	Gray Top Tube	8 mL	07/28/2019 11:40	Femoral Blood	
002	Gray Top Tube	8 mL	07/28/2019 11:40	Femoral Blood	
003	Gray Top Tube	8 mL	07/28/2019 11:40	Urine	
004	Gray Top Tube	2 mL	07/28/2019 11:40	Vitreous Fluid	

All sample volumes/weights are approximations.

Specimens received on 07/30/2019.



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Chain 190728-31
Patient ID 190728-31

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Detailed Findings:

Analysis and Comments	Result	Units	Rpt. Limit	Specimen Source	Analysis By
4-ANPP	Positive	ng/mL	0.10	001 - Femoral Blood	LC/TOF-MS
Caffeine	Positive	mcg/mL	0.20	001 - Femoral Blood	LC/TOF-MS
Cotinine	Positive	ng/mL	200	001 - Femoral Blood	LC/TOF-MS
Naloxone	Positive	ng/mL	1.0	001 - Femoral Blood	LC/TOF-MS
Quinine	Positive	ng/mL	200	001 - Femoral Blood	LC/TOF-MS
Diphenhydramine	300	ng/mL	50	001 - Femoral Blood	LC-MS/MS
Amphetamine	13	ng/mL	5.0	001 - Femoral Blood	LC-MS/MS
Methamphetamine	290	ng/mL	5.0	001 - Femoral Blood	LC-MS/MS
Fentanyl	32	ng/mL	0.10	001 - Femoral Blood	LC-MS/MS
Norfentanyl	7.0	ng/mL	0.20	001 - Femoral Blood	LC-MS/MS
Morphine - Free	670	ng/mL	25	003 - Urine	LC-MS/MS
6-MAM - Free	160	ng/mL	5.0	003 - Urine	LC-MS/MS

Other than the above findings, examination of the specimen(s) submitted did not reveal any positive findings of toxicological significance by procedures outlined in the accompanying Analysis Summary.

Reference Comments:

1. 4-ANPP (Despropionyl fentanyl) - Femoral Blood:

4-ANPP (despropionylfentanyl) is a precursor chemical used in the production of fentanyl/fentanyl related compounds and is also a fentanyl metabolite and may be a metabolite of other fentanyl-related compounds. It is considered to be pharmacologically weak.

The reported qualitative result for this substance was based upon a single analysis only. If confirmation testing is required please contact the laboratory.

2. 6-MAM - Free (6-Monoacetylmorphine; Heroin Metabolite) - Urine:

6-monoacetylmorphine (6-MAM) is the 6-monoacetylated form of morphine, which is pharmacologically active. When present it is generally indicative of heroin (diacetylmorphine) use. It may be present in both conjugated and unconjugated forms.

3. Amphetamine - Femoral Blood:

Amphetamine (Adderall, Dexedrine) is a Schedule II phenethylamine CNS-stimulant. It is used therapeutically in the treatment of narcolepsy and obesity and also in the treatment of hyperactivity in children. Amphetamine has a high potential for abuse. When used in therapy, initial doses should be small and increased gradually. In the treatment of narcolepsy, amphetamine is administered in daily divided doses of 5 to 60 mg. For obesity and children with attention deficits, usual dosage is 5 or 10 mg daily.

Following a single oral dose of 10 mg amphetamine sulfate, a reported peak blood concentration of 40 ng/mL was reached at 2 hr. Following a single 30 mg dose to adults, an average peak plasma level of 100 ng/mL was reported at 2.5 hr. A steady-state blood level of 2000 - 3000 ng/mL was reported in an addict who consumed approximately 1000 mg daily.

Overdose with amphetamine can produce restlessness, hyperthermia, convulsions, hallucinations, respiratory and/or cardiac failure. Reported blood concentrations in amphetamine-related fatalities ranged from 500 - 41000 ng/mL (mean, 9000 ng/mL). Amphetamine is also a metabolite of methamphetamine, benzphetamine and selegiline.



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Reference Comments:

4. Caffeine (No-Doz) - Femoral Blood:

Caffeine is a xanthine-derived central nervous system stimulant. It also produces diuresis and cardiac and respiratory stimulation. It can be readily found in such items as coffee, tea, soft drinks and chocolate. As a reference, a typical cup of coffee or tea contains between 40 to 100 mg caffeine.

The reported qualitative result for this substance was based upon a single analysis only. If confirmation testing is required please contact the laboratory.

5. Cotinine (Nicotine Metabolite) - Femoral Blood:

Cotinine is a metabolite of nicotine and may be encountered in the fluids and tissues of an individual as a result of tobacco exposure.

Anabasine is a natural product occurring in tobacco, but not in pharmaceutical nicotine and a separate test for anabasine in urine can be used to distinguish tobacco from pharmaceutical nicotine use.

The reported qualitative result for this substance was based upon a single analysis only. If confirmation testing is required please contact the laboratory.

6. Diphenhydramine (Benadryl®; Ingredient of Benylin and Panadol; Nytol; Unisom) - Femoral Blood:

Diphenhydramine is an antihistamine with sedative and anti-emetic effects. It is rapidly absorbed following oral administration; however, it is frequently given IV. Patients taking this medication are usually warned against the operation of complicated machinery, because of its strong sedative effects.

Following a single 50 mg oral dose of diphenhydramine, peak plasma concentrations at 2.3 hr averaged 66 ng/mL.

Signs and symptoms of acute diphenhydramine toxicity include tremor, seizures, fever, respiratory depression and cardiac arrhythmias. The average blood diphenhydramine concentrations reported in fatal overdoses were 1400 ng/mL in infants, 4400 ng/mL in children and 15000 ng/mL in adults.

The blood to plasma concentration ratio for diphenhydramine is approximately 0.80.

7. Fentanyl (Duragesic®; Sublimaze®) - Femoral Blood:

Fentanyl is a DEA Schedule II synthetic morphine substitute anesthetic/analgesic. It is reported to be 80 to 200 times as potent as morphine and has a rapid onset of action as well as addictive properties.

It is reported that patients lost consciousness at mean plasma levels of fentanyl of 34 ng/mL when infused with 75 mcg/Kg over a 15 min period; peak plasma levels averaged 50 ng/mL.

After application of a fentanyl transdermal preparation (patch), serum fentanyl concentrations are reported to be in the following ranges within 24 hours:

25 mcg/hour patch: 0.3 - 1.2 ng/mL

50 mcg/hour patch: 0.6 - 1.8 ng/mL

75 mcg/hour patch: 1.1 - 2.6 ng/mL

100 mcg/hour patch: 1.9 - 3.8 ng/mL

Following removal of the patch, serum fentanyl concentrations are reported to decrease with a mean elimination half-life of 17 hours (range, 13 to 22 hours).

The mean peak plasma serum fentanyl concentration in adults given an 800 mcg oral transmucosal fentanyl preparation over 15 minutes is reported at 2.1 ng/mL (range, 1.4 - 3.0 ng/mL) at approximately 0.4 hours.

Signs associated with fentanyl toxicity include severe respiratory depression, seizures, hypotension, coma and death. In fatalities from fentanyl, blood concentrations are variable and have been reported as low as 3 ng/mL.

Substance(s) known to interfere with the identity and/or quantity of the reported result: 4-methylphenethyl acetyl fentanyl



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Reference Comments:

8. Methamphetamine - Femoral Blood:

d-Methamphetamine is a DEA schedule II stimulant drug capable of causing hallucinations, aggressive behavior and irrational reactions. Chemically, there are two forms (isomers) of methamphetamine: l- and d-methamphetamine. The l-isomer is used in non-prescription inhalers as a decongestant and has weak CNS-stimulatory activity. The d-isomer has been used therapeutically as an anorexic agent in the treatment of obesity and has potent CNS-, cardiac- and circulatory-stimulatory activity. Amphetamine and norephedrine (phenylpropanolamine) are metabolites of methamphetamine. d-Methamphetamine is an abused substance because of its stimulatory effects and is also addictive.

A peak blood concentration of methamphetamine of 20 ng/mL was reported at 2.5 hr after an oral dosage of 12.5 mg. Blood levels of 200 - 600 ng/mL have been reported in methamphetamine abusers who exhibited violent and irrational behavior. High doses of methamphetamine can also elicit restlessness, confusion, hallucinations, circulatory collapse and convulsions.

*In this case, the level of methamphetamine determined has not been differentiated according to its isomeric forms. Differentiation of the isomers of methamphetamine is available upon request.

9. Morphine - Free (Heroin Metabolite) - Urine:

Morphine is a DEA Schedule II narcotic analgesic. In analgesic therapy, it is usually encountered as the parent compound, however, it is also commonly found as the metabolite of codeine and heroin. In illicit preparations from which morphine may arise, codeine may be present as a contaminant. A large portion of the morphine is bound to the blood proteins or is conjugated; that which is not bound or conjugated is termed 'free morphine'. Hydromorphone is a reported metabolite of morphine.

In general, free morphine is the active biologic agent. Morphine has diverse effects that may include analgesia, drowsiness, nausea and respiratory depression. 6-monoacetylmorphine (6-MAM) is the 6-monoacetylated form of morphine, which is pharmacologically active. It is commonly found as the result of heroin use.

10. Naloxone (Narcan®) - Femoral Blood:

Naloxone is a narcotic antagonist used to counter the central nervous system depression effects of opioids, including respiratory depression. It is also used for the diagnosis of suspected acute opioid overdose. Naloxone is available as a 0.4 mg/mL solution of the hydrochloride for parenteral injection.

Naloxone is also available in combination with buprenorphine (Suboxone®) for the treatment of opioid dependence. This combination is available in tablets of 2 mg buprenorphine with 0.5 mg naloxone or 8 mg buprenorphine with 2 mg of naloxone for sublingual administration.

The reported qualitative result for this substance was based upon a single analysis only. If confirmation testing is required please contact the laboratory.

11. Norfentanyl (Fentanyl Metabolite) - Femoral Blood:

Norfentanyl is the primary inactive metabolite of the synthetic narcotic analgesic fentanyl.

Substance(s) known to interfere with the identity and/or quantity of the reported result: Benzyl Fentanyl

12. Quinine (Qualaquin®; Quindan®; Quinimax®) - Femoral Blood:

Quinine is derived from the bark of the cinchona tree. It has been used in the past as an antimalarial, but is more commonly used today to treat muscle cramps. It is also used as a flavoring agent in tonic water and as a cutting agent adulterant in illicit heroin. Quinine may contribute to symptoms of cinchonism which are reversible upon discontinuation of treatment. Symptoms may include vomiting, diarrhea, abdominal pain, cardiac arrhythmias, prolonged QT intervals, vasodilation and sweating. Central nervous system (CNS) effects include headache, vertigo, tinnitus, deafness, blindness, and blurred vision.

The reported qualitative result for this substance was based upon a single analysis only. If confirmation testing is required please contact the laboratory.

Unless alternate arrangements are made by you, the remainder of the submitted specimens will be discarded one (1) year from the date of this report; and generated data will be discarded five (5) years from the date the analyses were performed.



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Workorder 19227051 was electronically
signed on 08/15/2019 13:26 by:

Jennifer L. Turri, M.S.F.S., D-ABFT-FT
Certifying Scientist

Analysis Summary and Reporting Limits:

All of the following tests were performed for this case. For each test, the compounds listed were included in the scope. The Reporting Limit listed for each compound represents the lowest concentration of the compound that will be reported as being positive. If the compound is listed as None Detected, it is not present above the Reporting Limit. Please refer to the Positive Findings section of the report for those compounds that were identified as being present.

Acocde 52441B - Diphenhydramine Confirmation, Blood - Femoral Blood

-Analysis by High Performance Liquid Chromatography/ Tandem Mass Spectrometry (LC-MS/MS) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
Diphenhydramine	50 ng/mL		

Acocde 52483B - Amphetamines Confirmation, Blood - Femoral Blood

-Analysis by High Performance Liquid Chromatography/ Tandem Mass Spectrometry (LC-MS/MS) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
Amphetamine	5.0 ng/mL	Methamphetamine	5.0 ng/mL
Ephedrine	5.0 ng/mL	Norpseudoephedrine	5.0 ng/mL
MDA	5.0 ng/mL	Phentermine	5.0 ng/mL
MDEA	5.0 ng/mL	Phenylpropanolamine	5.0 ng/mL
MDMA	5.0 ng/mL	Pseudoephedrine	5.0 ng/mL

Acocde 52484B - Fentanyl and Acetyl Fentanyl Confirmation, Blood - Femoral Blood

-Analysis by High Performance Liquid Chromatography/ Tandem Mass Spectrometry (LC-MS/MS) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
Acetyl Fentanyl	0.10 ng/mL	Norfentanyl	0.20 ng/mL
Fentanyl	0.10 ng/mL		

Acocde 8052B - Postmortem, Expanded, Blood (Forensic) - Femoral Blood

-Analysis by Enzyme-Linked Immunosorbent Assay (ELISA) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
Barbiturates	0.040 mcg/mL	Gabapentin	5.0 mcg/mL
Cannabinoids	10 ng/mL	Salicylates	120 mcg/mL

-Analysis by Headspace Gas Chromatography (GC) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
Acetone	5.0 mg/dL	Isopropanol	5.0 mg/dL
Ethanol	10 mg/dL	Methanol	5.0 mg/dL



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Analysis Summary and Reporting Limits:

-Analysis by High Performance Liquid Chromatography/Time of Flight-Mass Spectrometry (LC/TOF-MS) for: The following is a general list of compound classes included in this screen. The detection of any specific analyte is concentration-dependent. Note, not all known analytes in each specified compound class are included. Some specific analytes outside these classes are also included. For a detailed list of all analytes and reporting limits, please contact NMS Labs.

Amphetamines, Anticonvulsants, Antidepressants, Antihistamines, Antipsychotic Agents, Benzodiazepines, CNS Stimulants, Cocaine and Metabolites, Hallucinogens, Hypnotics, Hypoglycemics, Muscle Relaxants, Non-Steroidal Anti-Inflammatory Agents, Opiates and Opioids.

Acetaminophen - 6-Monoacetylmorphine - Free (Unconjugated), Urine

-Analysis by High Performance Liquid Chromatography/ Tandem Mass Spectrometry (LC-MS/MS) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
6-MAM - Free	5.0 ng/mL	Morphine - Free	25 ng/mL